

100 °F



100 °F

# Homogeneous

100 °F

# incubation temperature

100 °F

Homogeneous temperature in the egg is vital to optimal embryo development – and this is exactly what Pas Reform incubators provide. Their modular design reflects a deep understanding of the needs of the growing embryo, maximising hatchability and chick quality. Each 19,200-egg incubator section is equipped with separate heating, cooling and ventilation controls.



# Chick quality and hatchability depend on a homogeneous incubation temperature

To achieve the best possible hatching percentages and the highest possible quality in day-old chicks, incubator technology must create a climate that mimics the conditions in a broody hen's nest.

## Impact on hatchability

Biological and physiological research on embryos has shown that temperature is the most critical environmental influence on the developing embryo. Even minor fluctuations can have a major impact on hatchability and chick quality. In Pas Reform incubators, the average difference in eggshell temperature ( $\Delta T$ ) is only 0.5 °F (see Figure 1).

## All-In / All-Out incubation

The modular design of our incubators is what helps them meet these specific requirements. It's based on sections with a capacity of 19,200 hen eggs, each with separate heating, cooling and ventilation controls. During the setting period, some sections will therefore be cooling while others are heating – the only possible way to guarantee an even incubation temperature. This design allows All-In/All-out incubation with capacities from 19,200 up to 115,200 eggs, making it possible for Pas Reform to supply the largest All-In/All-out incubators on the market.

Dinos 115 setter (capacity 115,200 hen eggs)

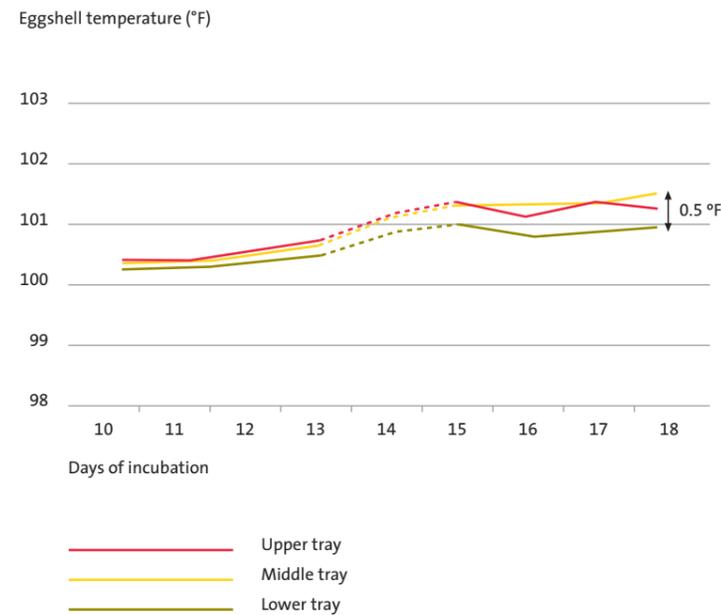
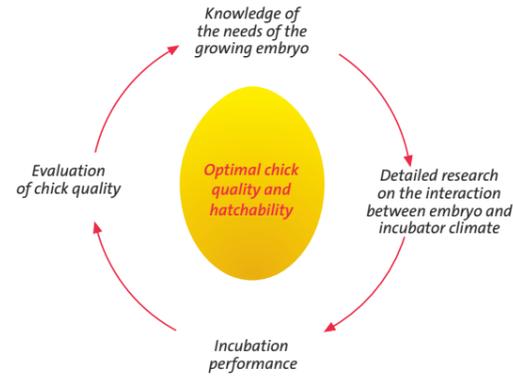
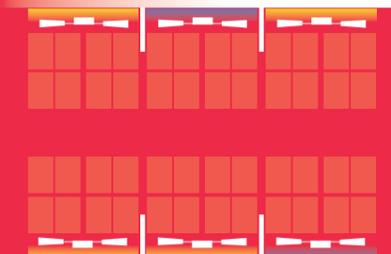


Figure 1. Av. eggshell temperature (as a reference for embryo temperature), measured during the last stage of the setting period at three different levels of a setter trolley in a Dinos 115 All-In /All-Out setter (capacity 115,200 hen eggs)

## Embryo development



# Expertise based on knowledge of the needs of the growing embryo

Pas Reform owes its expertise in incubator design to its longstanding research into the biological and physical aspects of embryo development and physiology. In this research we evaluate incubation and hatching results through a detailed and systematic analysis of embryo mortality and hatchability. Our physical research involves close monitoring and detailed registration of the climate throughout the incubation period.

## Evidence-based products

In a typical experiment, we mark three trays on a trolley at three levels (upper, middle and lower). Per tray, we then record moisture loss, embryonic mortality, hatchability, chick weight and chick quality. As a reference for embryo temperature, detailed measurements are also made of eggshell temperature. At 60-second intervals throughout the period, we record the air temperature at 75 different points in a 19,200-egg section.

O<sub>2</sub> and CO<sub>2</sub> levels are also vital to incubation. To gain greater understanding of embryo metabolism and to test CO<sub>2</sub> equipment, we constantly measure and analyse CO<sub>2</sub> concentrations.

Research into the total needs of the growing embryo generates the data that allows us to continuously optimise incubator performance.

# Pasgar@score evaluates chick quality

In daily hatchery practice, the quality of day-old chicks is the most important measure of incubation output. Though hatchery managers agree on the characteristics of a first-class day-old chick, they lack an objective method for scoring them.

To fill this gap, Pas Reform developed the Pasgar@score, which provides a clearly graduated scale for measuring a day-old chick's health. Here's how it works: a score-sheet is used to determine a score out of 10. Each sample chick is scored for weight and alertness, and for any abnormalities of the navel, legs, beak and abdomen. A top-quality chick is allocated grade 10. The greater the number of grade-10 chicks in a sample, the better the hatch.

## Perfect tool

The Pasgar@score has already proved to be a perfect tool for research on incubator performance, and, more specifically, for the objective and practical evaluation of incubation results by hatchery managers.



## Pasgar@score

Chicks without abnormalities are graded 10; each observed abnormality is graded by 1 point and subtracted from 10. The more chicks graded 10, the better the incubation.

- weight
- reflex
- navel
- leg
- beak
- belly



# Pas Reform Product information

## Hatching quality chicks

Pas Reform designs incubators based on deep knowledge of the needs of the growing embryo.

### Key features

- Pas Reform setters have a modular design with separate heating, cooling and ventilation controls per section of 19,200 hen eggs - providing homogeneous temperature, humidity and ventilation and thus allowing All-In/All-Out incubation in setters with capacities up to 115,200 hen eggs! All-In/All-Out incubation permits optimal incubation programming per batch and egg type, optimum hygiene and sanitation, and saves on labour costs.
- Airflow in Pas Reform setters runs parallel with the egg trays. Benefits: homogeneous temperature, moisture, O<sub>2</sub> and CO<sub>2</sub> distribution (even when the setter is not completely filled with eggs), because the airflow is not obstructed.
- Pas Reform setters can also be equipped with warm water heating - assists in the even distribution of warmth throughout the incubator, provides greater heating capacity, saves on energy costs and is flexible with regard to fuel sources.
- The corridor in Pas Reform setters - increases the volume and flow of air around the eggs, facilitates inspection and may be used for temporary storage of setter trolleys when other incubators are being cleaned, are undergoing maintenance, or when there is a peak in egg supply.
- Incubators are cooled primarily by water (as opposed to air cooling), which ensures that Pas Reform incubators are less dependent of the climatic conditions in the environment where they are located - saves on extra environmental controls for the hatchery as a whole.
- The cooling system of Pas Reform hatchers is incorporated in the aluminium panels of the cabinet - provides even distribution of cooled air and allows easy cleaning and disinfecting of the hatcher, thus preventing micro-organisms such as Salmonella and Campylobacter spreading and causing contamination in the food chain.
- The incubation process is controlled by the Navigator control system, which can be linked to a personal computer - allows precise programming of the incubation process, helps hatchery managers to modify and store custom incubation programs and allows remote diagnostics.

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P A S R E F O R M

HATCHERY TECHNOLOGIES

